

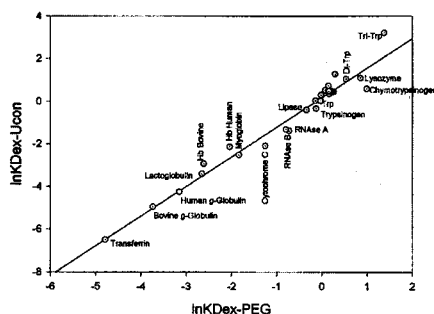
## Relationships between partition coefficients of biomolecules in several aqueous popymer/polymer two-phase systems

**Pedro P. Madeira**<sup>1,2,3</sup>, **José A. Teixeira**<sup>2</sup>, **Eugénia A. Macedo**<sup>1</sup>, **Larissa M. Mikheeva**<sup>3</sup> and **Boris Y. Zaslavsky**<sup>3</sup>

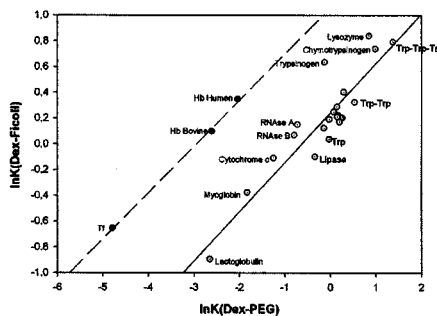
1. *Laboratory of Separation and Reaction Engineering, Dpt. de Engenharia Química, Faculdade de Engenharia da Universidade do Porto, Portugal*; 2. *IBB-Institute for Biotechnology and Bioengineering, Centre for Biological Engineering, Universidade do Minho, Campus de Gualtar 4710-057, Braga, Portugal*; 3. *Analiza, Inc. 26101 Miles Road, Cleveland, OH 44128, USA*  
 E-mail: ppalma@fe.up.pt

Partition coefficients for a variety of proteins, peptides, amino acids, and carbohydrates were measured in the aqueous two-phase systems (ATPS) Dextran-PES (modified starch); Dextran-Ficoll; Dextran-PEG, Dextran-Ucon50 (a random copolymer of ethylene glycol and propylene glycol); PES-Ficoll; PES-PEG; PES-Ucon; Ficoll-PEG and Ficoll-Ucon all containing 0.15M NaCl in 0.01M phosphate buffer, pH 7.4, at 23°C.

For the majority of the ATPS under study, the partition coefficients for all the solutes examined are interrelated according to the so-called Collander linear equation (see figure 1). For the other systems, although the majority of the solutes followed similar trends, there were some outliers (see figure 2). These results indicate that (1) by using the Collander relationship it is possible to predict partitioning on certain ATPS based on analysis of the protein partition behaviour in a given ATPS; (2) existence of Collander relationship shows that the driving force behind partitioning is not the protein-polymer but protein-aqueous media interactions; and (3) the lack of a single relationship in certain systems indicates the need to take into account different contributions of protein-solvent molecular interactions.



**Figure 1.** Logarithms of partition coefficients (*K*) for several solutes examined in Dex-Ucon system as a function of logarithms of *K* of the same solutes in Dex-PEG system.



**Figure 2.** Logarithms of *K* for several solutes examined in systems Dex-Ficoll as a function of logarithms of *K* of the same solutes in Dex-PEG system.